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A CENTERED-FOCUS SOFTWARE USER  
INTERFACE FOR STRUCTURED DOCUMENTS

by

Clark C. Evans

A provisional patent application submitted to the USPTO

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# 60265626

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Title: XFLD: A high-fidelity distributed, browser based user interface for the editing of structured documents.

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Date: 13<sup>th</sup> of March 2001

Presenter: Clark C. Evans

Abstract: Imagine an old-style typewriter where the typist's actions affect a fixed focal area with the paper scrolling through this region. This article presents a similar user interface for digital form editing, combining the context maintaining aspects of HTML based forms with the high fidelity controls and row-level locking found in traditional multiple screen client programs. This interface is especially interesting for collaborative editing of a single form; take for example, an agenda being filled in synchronously by attendees on a teleconference. Included is a potential markup language, XFLD, for describing this type of user interface.

# 60275132

Below is an example of the Xgenda editor, for creating a meeting agenda. By default, when opening an existing agenda the form displays as it would be printed. Note that borders are shown to simulate a printed page. If the page is too long to fit on one page, scroll bars appear on the right.

Xgenda ver 0.2, build 33

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Xgenda | Group Cost Savings Meeting

**Project:** A Project  
**Location:** Conference Room #1  
**Date:** October 12, 2000  
**Time:** 3:30pm to 5:00pm EST

**PURPOSE**

This last quarter's departmental evaluations indicate that Quality Control is a bottleneck as well as a current liability regarding escapes and delays. Our shipping department is having to deal with returns and it is being backed-up because it doesn't have a process for accepting, storing and transferring certain tag-items back to QC. QC has been reprimanded for non-compliance with our three-step program and since then it has been brought up that some of their testing equipment and logistic arrangements need to be fixed or replaced. (Notice that the Context contains a complex problem and it doesn't give a solution. Context is just an observation).

PEOPLE	Name	Role	Reason for Attending
	Rod Feldsman	Leader	Responsible for budget.
	Betty Strickland	Recorder	Accurate notes
	Laura Freimd	Participant	Responsible for making sure project is on track financially

TASK	Owner	Due Date	%
Prepare project plan -- develop major milestones and deliverables	Rod Feldsman	Prepare for 1st Meeting	

TOPIC	Presenter	Type	Time	%
Review Agenda so that each attendee understands the xgenda	Rod Feldsman	Informative	5 min	
Breakup into groups, and sort each category by importance	Betty Strickland	Group Discussion	2 hr	
				2 hr, 5 min

In the previous form, the user may use the arrow, tab, and enter keys to move around within the form. At any time, if the user presses the enter key or clicks with the mouse, the editor goes into “edit mode”, with the section (row) under the mouse pointer becoming the “active” row. Let us assume that “Rod Feldsman” was clicked. In this case, the screen would change the form to show:

storing and transferring certain tag-items back to Q. Q. has been reprimanded for non-compliance with our three-step program and since then it has been brought up that some of their testing equipment and logistic arrangements need to be fixed or replaced. (Notice that the Context contains a complex problem and it doesn't give a solution. Context is just an observation).

PEOPLE	Name	Role	Reason for Attending
	Rod Feldsman	Leader Recorder Facilitator Participant Devil's Advocate	Responsible for budget.

E-mail: Ronald.P.Feldsman@mailserver.a-very-long-comp

The name of a participant

Betty Strictland	Recorder	Accurate notes
Laura Freind	Participant	Responsible for making sure project is on track financially

TASK	Owner	Due Date	%
Prepare project plan -- develop major milestones and deliverables	Rod Feldsman	Prepare for 1st Meeting	

1. The focus row shows a complete row, which is usually the transactional unit within the user's mental space. This is not possible with the “form-based” approach.
2. The person's role can now be selected with a full-scale list box. This is not possible in the “form-based” approach, without creating a pop-up list box, due to lack of space.
3. The context of the row is not lost, as a wysiwyg version of the form is shown above and below the focus row.
4. A few items not visual on the printed form may be visible
5. Tab moves to the next column (or control) within the grid without the screen changing its shape.

From the previous form, if the user presses the enter key or clicks on Betty Strickland with the mouse, the screen changes to show the following.

some of their testing equipment and logistic arrangements need to be fixed or replaced.  
(Notice that the Context contains a complex problem and it doesn't give a solution. Context is just an observation).

PEOPLE	Name	Role	Reason for Attending
	Rod Feldsman	Leader	Responsible for budget.
	Betty Strickland	Recorder	Accurate notes

E-mail:

Role:

The name of a participant:

TASK	Owner	Due Date	%
Prepare project plan -- develop major milestones and deliverables	Rod Feldsman	Prepare for 1st Meeting	

TOPIC:

6. The area being edited (the central edit bar) does not move. Also, the form moves "up". This gives the appearance of the form "paper" moving through the edit area.
7. One can use the enter key to cycle through the entire form all while the part subject to change remains at the center of the screen and well within focus.
8. Having the editing area remain in center focus is completely different from both traditional techniques of form based visual interfaces.
9. When using the tab key, if focus is on the last control of the edit bar, pressing tab once again moves focus to the first control on the next row of the table being edited; or adds a new row if at the end of the table. If tab is pressed in the last control of a blank row, or enter is pressed on a blank row, then control moves to the next section.

From the previous form, assume the user selects “Devil’s Advocate” and then presses the ESC key, or clicks on a yellow area, such as to the right of Betty’s Name. The screen below is shown:

some of their testing equipment and logistic arrangements need to be fixed or replaced.  
(Notice that the Context contains a complex problem and it doesn't give a solution. Context is just an observation).

PEOPLE	Name	Role	Reason for Attending
	Rod Feldsman	Leader	Responsible for budget.
	Betty Strictland	Recorder, Devil's Advocate	Accurate notes
	Laura Freimd	Participant	Responsible for making sure project is on track financially

TASK	Owner	Due Date	%
Prepare project plan -- develop major milestones and deliverables	Rod Feldsman	Prepare for 1st Meeting	

TOPIC	Presenter	Type	Time	%
Review Agenda so that each attendee understands the xgenda	Rod Feldsman	Informative	5 min	
Breakup into groups, and sort each category by importance	Betty Strictland	Group Discussion	2 hr	

10. Notice that the edit operation was dismissed, with the changes saved.
11. Also note that the user's context within the document is preserved, in fact the visual portion of the form starts with "some of the..."
12. Further, the mouse pointer is moved over the link which corresponds to the control which has had focus. (Not implemented well, and not shown due to the limitation of the window snapshot method used).
13. The user can then use tab key in the same manner as they had in edit mode (with the form scrolling automatically), such that the center of the screen remains in focus. (Not implemented). Alternatively, this might be taking things too far, in which case, the tab and enter key can simply move the mouse pointer (Implemented).
14. At any time, the user can navigate around with the keyboard or mouse to select another field to edit and click or press enter to begin editing again.

From the previous form, assume the user navigates to and presses enter on “2” or clicks on “2”. The screen below is shown:

**Xgenda ver 0.2, build 33**

File Edit Action Settings Tools Help

Prepare project plan -- develop major milestones and deliverables Rod Feldsman Prepare for 1st Meeting

TOPIC	Presenter	Type	Time	%
Review Agenda so that each attendee understands the xgenda	Rod Feldsman	Informative	5 min	
Breakup into groups, and sort each category by importance	Rod Feldsman	Informative	2 hr	
	Betty Strickland	Group Discussion	0 min	
	Laura Freimd	Collect Individual Input	25	
		Decision by Consensus	50	
		Decision with Fallback	75	

How much time this topic will take

2 hr, 5 min

15. Notice that the appropriate row is loaded into the edit row, the remaining part of the document is show below (with a blank space to keep the paper illusion).
16. Also note that the field selected has focus and is highlighted for easy data entry. And note that the help text is relevant and not very far from the user's context.
17. What's important to recognize is that the edit bar (the user's focal point) is not changed, instead the underlying form has moved around the edit area as appropriate.

From the previous form, assume the user puts the mouse down on the ribbed area to the right of the % list box, and drags downward. This allows the edit area to be moved by the user as they see fit. This edit bar can be moved up and down, even to the point where the top or bottom part of the form isn't visible.

**Xgenda ver 0.2, build 33**

File Edit Action Settings Tools Help

Betty Strictland Recorder, Devil's Advocate Accurate notes

Laura Freimd Participant Responsible for making sure project is on track financially

TASK	Owner	Due Date	%
Prepare project plan -- develop major milestones and deliverables	Rod Feldsman	Prepare for 1st Meeting	

TOPIC	Presenter	Type	Time	%
Review Agenda so that each attendee understands the xgenda	Rod Feldsman	Informative	5 min	

Breakup into groups, and sort each category by importance

Rod Feldsman	Informative	2 hr
Betty Strictland	Group Discussion	0 min
Laura Freimd	Collect Individual Input	25
	Decision by Consensus	50
	Decision with Fallback	75

How much time this topic will take.

2 hr.

18. As the user drags the edit area up and down, the paper moves as appropriate.
19. It is also possible that dragging this edit area would leave the paper stationary and change what is being "blow-up", much like a magnifying glass going over paper. Dragging with the left mouse button rather than the right mouse button can do this. (Not implemented yet).
20. Note that neither of the two state-of the art approaches allows functionality even close to this.



From the previous form, the navigation bar on top, and the help bar can obviously be turned off. This creates the following visual:

**Xgenda ver 0.2, build 33**

File Edit Action Settings Tools Help

deal with returns and it is being backed-up because it doesn't have a process for accepting, storing and transferring certain tag-items back to QC. QC has been reprimanded for non-compliance with our three-step program and since then it has been brought up that some of their testing equipment and logistic arrangements need to be fixed or replaced. (Notice that the Context contains a complex problem and it doesn't give a solution. Context is just an observation).

PEOPLE	Name	Role	Reason for Attending
	Rod Feldsman	Leader	Responsible for budget.

Sagan Walis  
 E-mail: sw@slosh.net

Leader  
 Recorder  
 Facilitator  
 Participant  
 Devil's Advocate

Software engineer to provide feedback on information system impacts.

Betty Strickland	Recorder	Accurate notes
Helm Digsman		Responsible for success of project
Laura Freimd	Participant	Responsible for making sure project is on track financially

TASK	Owner	Due Date	%
Prepare project plan-- develop major	Rod Feldsman	Prepared for 1st Meeting	

21. There is very little difference between this view and the print-preview view. Once again, this has the advantage of the "form-based" editors without the contextual problems of the "control-based" editors.
22. At any time, function keys can be used to navigate. F5 moves to the previous section (in this case PURPOSE), and F8 moves to the first row of the next section (in this case TASK). F6 moves to the next row, while F7 moves to the previous row. Likewise, F2 inserts a row, and F10 deletes a row. The function keys take on the same sequence as the navigation bar above, so that the correspondence can be easily grocked.

From the previous form, pressing F1 brings up a “wizard” area below. In many circumstances, the user may be unfamiliar with the form to such a point where detailed, field level, help is required.

**Xgenda ver 0.2, build 33**

File Edit Action Settings Tools Help

deal with returns and it is being backed-up because it doesn't have a process for accepting, storing and transferring certain tag-items back to QC. QC has been reprimanded for non-compliance with our three-step program and since then it has been brought up that some of their testing equipment and logistic arrangements need to be fixed or replaced. (Notice that the Context contains a complex problem and it doesn't give a solution. Context is just an observation).

PEOPLE	Name	Role	Reason for Attending
	Rod Feldsman	Leader	Responsible for budget.

Sagan Walis  
 E-mail: sw@slosh.net

Leader  
 Recorder  
 Facilitator  
 Participant  
 Devil's Advocate

Software engineer to provide feedback on information system impacts.

**This is where the Wizard Help can go!**

This section of the screen is a web-like help system with hyperlinks. As the individual moves around up-above, this help page can change to give them detailed instructions about the particular section they are editing, and the information about the field that has focus.

23. F1 toggles the detailed help, without interrupting the user's context since they can see what is before them, and without taking focus away from what they are working on, here the edit focus remains on the text box containing Sagan Walis.
24. In the traditional “control-based” interface, the help is a usually a pop-up which both disrupts the user's context and also interrupts their typing. In this interface toggling F1 between the help and the following text occurs without a loss of focus.
25. In the modern “form-based” approaches, they often divide the screen in half, or provide a wizard area above. The problem with this approach is that there is contextual information between the control being edited and the help itself, and this contextual information (the form above/below the edit area) is distracting when the user is trying to focus on the content for a given field.

This type of interface has several limitations. For the most part, it can only handle a form that is a sequence of tables, given the degenerate table having one row and one column. In the frame below, it is shown how a limited support for hierarchies can be implemented:

milestones and deliverables	Rod Feldsman	Prepare for 1st Meeting	
Get lunch for next meeting from Indizza at 12:30	Betty Strickland	Pre-meeting Task	
Tablulate preliminary income statement using budget program	Sagan Walis, Helm Digsman	10 OCT 2000	

TOPIC	Presenter	Type	Time	%
Review Agenda so that each attendee understands the xgenda	Rod Feldsman Sagan Walis Betty Strickland Helm Digsman Laura Freimd	Informative Group Discussion Collect Individual Input Decision by Consensus Decision with Fallback	5 hr min	0 25 50 75
Brainstorm on cost savings, listing each opportunity	Rod Feldsman	Group Discussion	2 hr, 15 min	
Sort categories by importance	Rod Feldsman	Informative	15 min	
Organize cost savings brainstorm list into categories	Rod Feldsman	Group Discussion		
Breakup into groups, and sort each category by importance	Sagan Walis, Betty Strickland	Group Discussion	2 hr	

26. Here the topic "Brainstorm..." has two children, "Sort..." and "Organize...". Simple indentation is used, although pictures may be a nice visual addition (or distraction).
27. F9 and F10 can be used to indent and un-indent a given block. And F3 and F4 can be used to swap a row up or down. Of course
28. Many of the "form-based" approaches I've seen do not do a good job at allowing rows to be moved around, while the "control-based" ones typically have one grid(section) per page. And this is usually a great waster of space.
29. If you notice in the navigate bar, the fourth button over, Swap Down, is enabled. It is enabled since there is an adjacent row that it can swap with.

By pressing the swap down button, you can see that not just one row was swapped. Swap works within the current indentation level, thus “Sort...” and “Organize...” were treated as a part-of the “Brainstorm...”

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File Edit Action Settings Tools Help

? [Icons]

TOPIC	Presenter	Type	Time	%
Brainstorm on cost savings, listing each opportunity	Rod Feldsman	Group Discussion	2 hr, 15 min	
Sort categories by importance	Rod Feldsman	Informative	15 min	
Organize cost savings brainstorm list into categories	Rod Feldsman	Group Discussion		
Review Agenda so that each attendee understands the xgenda	Rod Feldsman	Informative		
	Sagan Walis	Group Discussion	5 hr	0
	Betty Strickland	Collect Individual Input	min	25
	Helm Digsman	Decision by Consensus		50
	Laura Freimd	Decision with Fallback		75
Breakup into groups, and sort each category by importance	Sagan Walis, Betty Strickland	Group Discussion	2 hr	
			4 hr, 35 min	

30. Note here, that both swap up and swap down are enabled, this is because the current row has both a previous and a following sibling.
31. Most “form-based” interfaces tend to do this poorly, while most control-based interfaces handle hierarchies very well, but lack the contextual information and tend to jar the user.
32. As seen on the screen, there isn’t a visual clue if the current row is indented or not; this remains to be implemented. It merely involves moving the first edit box in to the current indentation level.

It is possible in this interface for one of the tables to define the allowable values in the list box of another table's field. Also, changing the value in once place can be percolated. For instance, in this prototype, the user could change "Rod" to "Jake", and the tasks and topics that Rod was the owner/presenter are now changed to reflect Jake as a replacement. Thus, values can be handled by position and lookups can be done in the background for the remainder of the document.

non-compliance with our three-step program and since then it has been brought up that some of their testing equipment and logistic arrangements need to be fixed or replaced. (Notice that the Context contains a complex problem and it doesn't give a solution. Context is just an observation).

PEOPLE	Name	Role	Reason for Attending
	Jake Feldsman	Leader	Responsible for budget.
	Ronald.P.Feldsman@mai	Participant	Responsible for making sure project is on track financially

The name of a participant

Helm Digsman

TASK	Owner	Due Date	%
Prepare project plan -- develop major milestones and deliverables	Jake Feldsman	Prepare for 1st Meeting	
Get lunch for next meeting from Indizza at			

33. It also goes without saying that these list boxes could be populated from a database, another form, or many other dynamic methods (the prototype has them hard-coded with the Owner/Presenter as the sole exception).
34. Furthermore, it is possible to have multiple optional sections. This is not implemented, but the settings menu could easily be altered to make the task section optional.
35. Also, one could have one table be used to specify additional document fragments (one or more tables) later on in the document. This would be difficult to do in a control-based form. It would be possible in a form-based version, but not so easy.

A great deal of time is spent entering structured information into a software system via forms. There are two state of the art techniques. In the first technique, “control-based”, the form is presented as sequence of visual controls, such as text edit boxes, drop-down lists, date-pickers, tabular grids with each section of the form on a separate tabbed screen. Although these controls individually allow for very easy data entry, they consume significant screen real estate so that most of the form is not readily visible and the form is not shown on the screen as it may print. Thus, it is hard for the user to retain their context, especially when tab-order is wrong or which widget has focus is not easily ascertained.

The other approach “form-based”, takes the other extreme by presenting the form “wysiwyg”, dynamically creating a one widget at a time that floats over the form when a field is clicked upon or tabbed into. Although this allows more information to appear on the screen at once and looks more like the printed page, the size of the edit controls used must be fairly small. The dynamic appearance/disappearance of the controls can be jarring. Further this approach causes large jumps when the user reaches the bottom of a page and must scroll down further to continue data entry on long forms. In both of these approaches, the user must re-focus to the next widget on the screen as they navigate around the form. And further, help information is not readily available and is usually put in a separate window or in a status bar well out of the user’s focus.

PEOPLE	Name	Role	Reason for Attending
	Rod Feldsman	Leader	Responsible for budget
	Rod's Son	Participant	Part of the deployment team Will give feasibility feedback
	Betty Stinctland	Leader	Accurate notes
		Recorder	
		Facilitator	
		Participant	
		Devil's Advocate	

The participant's e-mail for Xgenda notifications	
Helm Digsman	Responsible for success of project
Laura Fremnd	Participant Responsible for making sure project is on track financially

TASK	Owner	Due Date	%
Prepare project plan - develop major	Rod Feldsman	Prepare for 1st Meeting	

The approach presented here is a hybrid of these two approaches. Much like a typewriter, the user has a constant “focus-row” for traditional widget-based editing, with a “wysiwyg” version of the form above and below the focal point. This approach is superior to the ‘control-based’ approach since it allows for more of the form to be visible, giving the user better context for the information requested. This approach is superior to the “form-based” approach since it has a far larger editing area allowing large lists, edit areas, and perhaps other widgets familiar to the “control-based” approach. The result is highly dynamic environment where the form moves past the user, rather than having the user move past the form. Furthermore, this approach also allows for help information to be displayed well within the user’s focal perspective.

The keyboard operation of this interface is rather obvious. The ENTER key slides the paper backdrop up one row, updating the underlying document if any changes were made. The TAB key moves to the next field on the focus area, scrolling the paper backdrop up one row with appropriate changes if the focus is on the last widget. The CTRL variants of TAB and ENTER work in the opposite manner. The ALT-ENTER moves to the next section, in the screen shot, the paper scrolls so that the first task has editing focus. It is also possible to move and sort blocks within a section, such as re-ordering the task list. The interface also provides facilities for inserting and deleting blocks within a section, such as deleting a meeting participant. There is also limited support for hierarchical blocks with function keys, allowing for nesting sub-tasks or similar information. Particular attention is made so that the keyboard interface is very clean and easy to use. Pressing F1 can turn the bottom area into a full-fledged help wizard without destroying user context or popping up a window, and pressing F2 can be used to add an attachment or note to a given row. Of course, pressing ESC clears the focal row entirely so that a print-ready version of the form can be viewed.

In a distributed (but synchronous) setting, this interface has surprising set of features that set it apart from other interfaces. First, at any given time, only a small amount of the document is actually editable. This would allow for a very direct “block” level locking mechanism to be implemented on a server. When a user enters a block, a quick round-trip is done, the server can return “read/only” or “read/write” depending upon the user’s access levels and also dependent if someone else is currently in that particular block. Second, document style revision control can be used. A particular user can be allowed to make ‘suggested’ changes or actual changes with another individual having accept/reject privileges. As changes are made, they can be highlighted on collaborating user’s display using traditional strikeout or highlighting. Third, the interface provides a very nice notion of document-level transaction. In current interfaces, which screens commit and which ones don’t commit, or what fields are changed quickly becomes unmanageable for the user. With this interface, the changes are clearly marked and review able before making the transaction durable. By itself none of these are novel or hard to implement, but the combination is rather unique and has a surprising effect.

With these bonuses comes a strict information model. Each document is thought to have a sequence of sections. Each section can have zero or more blocks. A block has a 1-1 correspondence with the focus area that edits one and only one block at a given time. Within each block are multiple fields, each field can have multiple values, and each value has a caption and an optional numeric identifier. Note that a block must be a dividable region within the source document for the focus area illusion to work and is typically a row in a table. This information model has a close correspondence with relational databases: a section is a table, a block is a row, and a field is a column. Therefore it is at least possible to build a rather generic mapping system to hook this interface up to your typical database, complete with field-level help. Note that it is also possible to have blocks in one section to ‘generate complete sections of their own. Thus, it is possible to map to arbitrary nesting depths with this method, although the result may be pushing this style of interface a bit too far. Also note that within a given section, re-ordering of blocks can be disabled if a particular order is important. Sections can also be optional.

Mapping the information to be edited onto both the HTML to be shown, and also to some sort of description of the focus bar is non-trivial and perhaps the heart of the problem. The technique employed is to have an arbitrary data source, either XML or relational databases generate a XHTML+XFLD document. Since XHTML is well known, it will not be described. The remainder of this text will focus on XFLD, of which there are five distinct components.

The first component is the description of an edit bar. One or more forms are included in a template, and a template can either be embedded in an XHTML document, or can be linked to, via a method to be determined. A given template has can have children such as "text", "label", "textarea", "select", which refer directly to screen widgets or to layout control items, such as "vbox", "hbox" and "spacer". Each item can have a width in pixels or as a percentage of remaining space. Widgets used for user input may have a "field" attribute, which will be discussed in the next paragraph. The label widget can have a caption attribute. At immediate children of the form represent the columns. XML Forms was considered and may be used in the future. Below is an example of the "person" form used in the example above.

```
<xfld:form id="person" >
  <xfld:spacer width="80" />
  <xfld:vbox width="40%" >
    <xfld:text field="name" />
    <xfld:label caption="E-Mail:" />
    <xfld:text field="e-mail" />
  </xfld:vbox>
  <xfld:select width="20%" field="time" multiple="true" item-list="role" />
  <xfld:textarea width="40%" field="reason" />
</xfld:form>
```

The second component is a method for obtaining pick-lists. For this release, pick lists for a template must be included as a child of the template, using the item-list tag. This tag has an id attribute that is associated with select element's item-list attribute. Each item in the item-list must have a caption and may have an integer id. The caption attribute is used to populate the drop down control, and the item attribute is used as the item data for the list entry. In the future other mechanisms may come appropriate, particularly the ability to fetch an item list independent of the template. Also, it should be noted that the current implementation is dynamic, so item-lists may change as required. This is useful since one section may be used to generate lists used in other sections; for example, the task section may have a person pick-list. Below is an example of the role item-list.

```
<xfld:item-list id="role">
  <xfld:item caption="Leader"/>
  <xfld:item caption="Recorder"/>
  <xfld:item caption="Facilitator"/>
  <xfld:item caption="Participant"/>
  <xfld:item caption="Devil's Advocate"/>
  <xfld:item caption="Timekeeper"/>
  <xfld:item caption="AudioVisual"/></xfld:item-list>
```

The third component is the binding of the content found within the XHTML file to what is required by the focus area for editing. This is done with attributes marking the role that particular XHTML tags play. The section attribute is used to mark tags that act as sections and the value for this attribute is used to identify the section where changes are made. A tag marked with the section attribute may also have a single attribute which



designates that the section has one and only one block, a form attribute, which gives the default form used for each block, an optional attribute to mark if the user can ask for the section to be hidden, a “order” attribute to specify if re-ordering of blocks is allowed, and an indent attribute to designate if the blocks in the section can be indented.

The next set of attributes is for blocks. A block attribute is used to mark which tag has the block role and the attributes value is used to identify the block when changes are made. A block can have a depth attribute to specify how deeply indented the block is for blocks. And finally, a block can have a form attribute if it wishes to override the default form for the section.

The last set of attributes is for fields and values. A field attribute works just like the block and section attributes, and its value is used to identify the field during editing. Since a field can have multiple values, there is, in addition, a value tag that can be used to mark that the contents of a tag is a value. The content of the value tag can be used to provide a numeric identifier for the value. For those fields that are editable but not displayed in the HTML, a caption attribute is also provided. Below is an example, where only the row being edited in the image above is shown.

```
<div xfld:section="person">
  <table cellPadding="3" width="100%"border="0">
    <tr><td vAlign="top" width="75%"><b>PEOPLE</b></td>
      <td width="25%"><b>Name</b></td>
      <td width="15%"><b>Role</b></td>
      <td width="50%"><b>Reason for Attending</b></td>
    </tr>
    ...
    <tr xfld:block="3"><td width="75" />
      <td width="25%">
        <span xfld:field="name">Betty Strickland</span>
        <span xfld:field="e-mail" xfld:caption="betty@company.com" /></td>
        <td xfld:field="role" width="15%">Recorder</td>
        <td xfld:field="reason" width="40%">Accurate notes</td></tr>
    ...
  </table><br /></div>
```

The fourth component of XFLD is the change notification. The goal of this component is two fold, to provide update notification and to act as a history of changes for undo-redo log or a syntax highlighting mechanism to identify changes. Each item tracks a set of changes to a block and includes the section identifier, block identifier, user who made the changes, the date/time of the change, and a unique identifier. Items can be create, update, delete, move, and indent. Items usually will have one or more before/after field value children containing the necessary information to follow-through with the change or roll-back the change.

The fifth component of XFLD provides for a locking mechanism and ownership management. The details of this protocol have yet to be determined, but will contain messages like “user locked section x, block 3” and could notify the (perhaps local or peer-to-peer) server accordingly as the user moves about. In this way, if one user enters a field that another user has entered, then it will show up grey on their screen if pessimistic locking is in effect, otherwise optimistic locking may be used depending upon how this works out. More research is needed here before the paper is presented!

- <xgenda>

- <head>

  <title>**Group Cost Savings Meeting**</title>

  <project>**A Project**</project>

  <location>**Conference Room #1**</location>

  <date>**October 12, 2000**</date>

  <time>**3:30pm to 5:00pm EST**</time>

</head>

<purpose>**This last quarter's departmental evaluations indicate that Quality Control is a bottleneck as well as a current liability regarding escapes and delays. Our shipping department is having to deal with returns and it is being backed-up because it doesn't have a process for accepting, storing and transferring certain tag-items back to QC. QC has been reprimanded for non-compliance with our three-step program and since then it has been brought up that some of their testing equipment and logistic arrangements need to be fixed or replaced. (Notice that the Context contains a complex problem and it doesn't give a solution. Context is just an observation).**</purpose>

- <person-list>

  - <person>

    <id>**1**</id>

    <name>**Rod Feldsman**</name>

    <e-mail>**Ronald.P.Feldsman@mailserver.a-very-long-company-name.com**</e-mail>

    <role>**Leader**</role>

    <reason>**Responsible for budget.**</reason>

  </person>

  - <person>

    <id>**2**</id>

    <name>**Rod's Son**</name>

    <e-mail>**nim-wit@home.com**</e-mail>

    <role>**Participant**</role>

    <role>**Recorder**</role>

    <reason>**This is a hierarchical child**</reason>

  </person>

  - <person>

    <id>**3**</id>

    <name>**Betty Strictland**</name>

    <role>**Recorder**</role>

    <reason>**Accurate notes**</reason>

  </person>

  - <person>

    <id>**4**</id>

    <name>**Helm Digsman**</name>

    <reason>**Responsible for success of project**</reason>

  </person>

  - <person>

    <id>**5**</id>

    <name>**Laura Freimd**</name>

    <role>**Participant**</role>

    <reason>**Responsible for making sure project is on track financially**</reason>

  </person>

</person-list>

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- <task-list>
- <task>
  <id>1</id>
  <description>Prepare project plan -- develop major milestones and deliverables</description>
  <person>1</person>
  <due>Prepare for 1st Meeting</due>
  <percent />
</task>
- <task>
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  <description>Get lunch for next meeting from Indizza at 12:30</description>
  <person>3</person>
  <due>Pre-meeting Task</due>
  <percent />
</task>
- <task>
  <id>3</id>
  <description>Tablulate preliminary income statement using budget program</description>
  <person>2</person>
  <person>4</person>
  <due>10 OCT 2000</due>
  <percent />
</task>
</task-list>
- <topic-list>
- <topic>
  <id>1</id>
  <description>Review Agenda so that each attendee understands the agenda</description>
  <person>1</person>
  <type>Informative</type>
  <hour />
  <min>5</min>
</topic>
- <topic>
  <id>2</id>
  <description>Brainstorm on cost savings, listing each opportunity</description>
  <person>1</person>
  <type>Group Discussion</type>
  <hour>2</hour>
  <min>15</min>
- <children>
- <topic>
  <id>3</id>
  <description>Organize cost savings brainstorm list into categories</description>
  <person>1</person>
  <type>Group Discussion</type>

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- <children>
  - <topic>
    <id>4</id>
    <description>Sort categories by importance</description>
    <person>1</person>
    <type>Informative</type>
    <min>15</min>
  </topic>
</children>
</topic>
- <topic>
  <id>5</id>
  <description>Breakup into groups, and sort each category by importance</description>
  <person>2</person>
  <person>3</person>
  <type>Group Discussion</type>
  <hour>2</hour>
  <min />
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</xgenda>

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2002-01-30 14:00:00

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Office of Initial Patent Examination

Application papers not suitable for publication

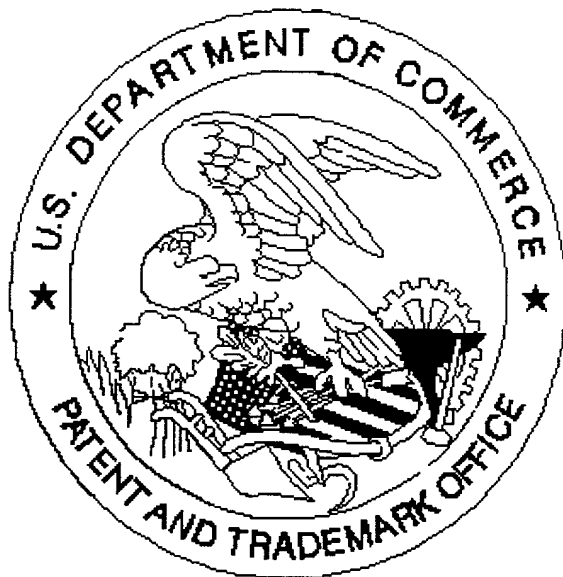
SN 10060221

Mail Date 02/01/02

- ☐ Non-English Specification
- ☐ Specification contains drawing(s) on page(s) \_\_\_\_\_ or table(s) \_\_\_\_\_
- ☐ Landscape orientation of text    ☐ Specification    ☐ Claims    ☐ Abstract
- ☐ Handwritten    ☐ Specification    ☐ Claims    ☐ Abstract
- ☐ More than one column    ☐ Specification    ☐ Claims    ☐ Abstract
- ☐ Improper line spacing    ☐ Specification    ☐ Claims    ☐ Abstract
- ☒ Claims not on separate page(s)
- ☒ Abstract not on separate page(s)
- ☐ Improper paper size -- Must be either A4 (21 cm x 29.7 cm) or 8-1/2"x 11"
- ☐ Specification page(s) \_\_\_\_\_    ☐ Abstract
- ☐ Drawing page(s) \_\_\_\_\_    ☐ Claim(s)
- ☐ Improper margins
- ☐ Specification page(s) \_\_\_\_\_    ☐ Abstract
- ☐ Drawing page(s) \_\_\_\_\_    ☐ Claim(s)
- ☐ Not reproducible    Section
- Reason    ☐ Specification page(s) \_\_\_\_\_
- ☐ Paper too thin    ☐ Drawing page(s) \_\_\_\_\_
- ☐ Glossy pages    ☐ Abstract
- ☐ Non-white background    ☐ Claim(s)
- ☐ Drawing objection(s)
- ☐ Missing lead lines, drawing(s) \_\_\_\_\_
- ☐ Line quality is too light, drawing(s) \_\_\_\_\_
- ☐ More than 1 drawing and not numbered correctly
- ☐ Non-English text, drawing(s) \_\_\_\_\_
- ☐ Excessive text, drawing(s) \_\_\_\_\_
- ☐ Photographs capable of illustration, drawing(s) \_\_\_\_\_

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Application deficiencies found during scanning:

☒ Page(s) 1 of 2 of declaration were not present  
for scanning. (Document title)

☐ Page(s) \_\_\_\_\_ of \_\_\_\_\_ were not  
present  
for scanning. (Document title)

- There are figures on 5 pages, not 13 pages.
- There are 16 pages of specification, not 22 pages.

☐ **Scanned copy is best available.**

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